Space Weather Forecast

Issued on Tuesday, 22 August 2023 at 13:26 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Ongoing chance of Moderate flares (R1-R2 Radio Blackouts). Slight chance G1 Minor Storms late day 2 or day 3 (23-24 Aug).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low with only common class flares, the largest from a new region rotating onto the disc in the east. There are ten sunspot regions on the disc, however these are generally small and simple. The largest of these is a moderately sized region in the northeast with some slight magnetic complexity, and was also the source of common class flares. The main region of interest is the new unnumbered region rotating onto the east limb. While currently at too oblique an angle to accurately assess, it is clearly already evident in imagery, suggesting it is a strong active region. Further details are likely to become apparent over the next 24-48 hours, including any magnetic complexity.

A filament eruption (which is the release of a line of plasma held together by the Suns magnetic field) was observed leaving the southwest disc at 21/1613 UTC, and a weak CME (coronal mass ejection) has been identified in the very limited imagery that is available. Confidence is very low, however at most a weak glancing interaction is possible later in the period. Further assessment is still being undertaken.

Solar Wind / Geomagnetic Activity: The recent fast wind, from a coronal hole, eased through the period. Solar wind speeds eased from elevated to be slightly elevated (around 550km/s to 460km/s). Total Interplanetary Magnetic Field (IMF) was weak with the north-south component initially mainly weakly positive (northward), but more generally weakly negative (southward) from 22/0015 UTC. Geomagnetic activity was Quiet to Unsettled (Kp1-3)

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar Activity is expected to be Low, but with a Chance of isolated Moderate-class flares.

Solar Wind / Geomagnetic Activity: There are no Earth-directed CMEs, however the CME from the 21 Aug may give a very slight glance towards the end of the period. This is still under analysis however. Current fast winds are expected to gradually and erratically ease day 1 and into day 2 (22-23 Aug), before the arrival of the next coronal hole sourced fast wind enhancement. This is a low confidence feature, however enhancement is most likely late day 2 or day 3 (23-24 Aug). Mainly Quiet geomagnetic activity at first, with isolated Unsettled spells. There is a slight chance of Active intervals day 1 (22 Aug), but more likely later day 2 and day 3 (23-24 Aug). There is a slight chance of isolated G1 Minor Storms with any arrival. Activity is expected to ease back to be mostly Quiet to Unsettled day 4 (25 Aug)

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to be at background with no solar radiation storms expected.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	10	20	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	30	30	40	40
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	2	2	2	2
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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